EXHIBIT II

JUPITER ICY MOONS ORBITER
RADIATION HARDENED MEMORY PROCUREMENT

CONTRACT PLANS AND DELIVERABLE DOCUMENTATION

JANUARY 27, 2004

Version	Date
Final	01/27/04

EXHIBIT II

DELIVERABLE DOCUMENTATION

The documentation deliverable under this Contract is summarized in the following Contract Data Requirements List (CDRL), which identifies the items to be delivered, when delivery is required, the quantity and type of each item, and the frequency of issue. The Data Requirement Description (DRD) forms referenced in the CDRL describe the specific requirements for the item(s) to be delivered, reference documents, and other instructions as to content, format and preparation.

The following shall apply to all submittals:

Electronic Submittals.

All data submitted in electronic format shall be Microsoft Office XP compatible or in PDF format; all pictures in JPEG format except as noted; and all mechanical drawings as native CAD format and PDF format.

Non-Design Document Identification.

The Contractor shall display on the cover or title page of all deliverable non-design documentation (all documents except drawings and specifications) the following minimum information:

1. Document title
2. Contractor's name
3. Contract number
4. Document number (JPL and/or Contractor assigned)
5. Subsystem or support equipment name
6. Approval signatures - Contractor and JPL; two (2) spaces for JPL signatures
7. Project identification: "JIMO" Project
8. Documents containing information pertaining to a subsystem or its support equipment shall use the applicable subsystem or support equipment reference designation number
9. Date of issue or publication
10. CDRL line item and DRD numbers
11. Revision or change identification

The CDRL is alphanumerically listed by the following disciplines:

AM-Analysis Models
CM – Configuration Management
EN – Engineering
ER – Environmental Requirements
MA-Management
PA – Product Assurance
PMP – Parts, Material and Processes
QA – Quality Assurance
RA – Reliability Assurance
SS – System Safety
T-Test

CONTRACT PLANS and DOCUMENTATION

The following abbreviations are used in this Exhibit

ADOC – After Date of Contract
CDR – Critical Design Review
CDRL – Contract Data Requirements List
CM – Configuration Management
CTM – Contract Technical Manager
DRD – Data Requirement Description
EIDP- End Item Data Package
ESD – Electro Static Discharge
JIMO – Jupiter Icy Moons Orbiter
JPEG – Joint Photographic Experts Group
JPL – Jet Propulsion Laboratory
k – kilo (1,000)
LM – Local Memory
MMR – Monthly Management Review
ns – nano second (10^-9 second)
NVMM – Non-Volatile Mass Memory
PDF – Portable Document File
PDR – Preliminary Design Review
P/FR – Problem/Failure Reports
PSA – Parts Stress Analysis
QA – Quality Assurance
rad– absorbed dose, (100 rad = 1 Gray (Gy))
Rad – Radiation
ROM – Read Only Memory
ROM – Rough Order of Magnitude
SEE – Single Event Effect
SEFI – Single Event Functional Interrupt
SEL – Single Event Latch up
SEU – Single Event Upset
SUROM – Start Up ROM
TID – Total Ionizing dose
TIM – Technical Interchange Meeting
WBS – Work Breakdown Structure
WCA – Worst Case Analysis

CONTRACT PLANS and DOCUMENTATION

Approval Requirements

Documents requiring JPL approval are identified in Block 7, APPROVAL CODE, of the CDRL. The following codes are used to denote approval requirements:

A - JPL approval is required

X - JPL approval is not required

After receipt of a submittal, JPL reviews the Contractor's submittal and either provides written review comments or a written approval with a letter or e-mail from JPL. In the event JPL does not provide a formal disapproval of the submittal or notification that additional time is required to complete the review in the period of time designated in the Statement of Work, then the Contractor may assume the submittal has an approval as tendered, unless otherwise indicated on the CDRL or unless otherwise agreed.

The following requirements apply to all data deliverables submitted for JPL approval.

(1) The Contractor shall submit the document for approval, with the Contractor-signed original cover or title page, on or before the date indicated.

(2) If the document is approved by JPL, JPL will transmit the signed cover or title page to the Contractor. The Contractor shall then prepare and deliver final copies as indicated in the CDRL.

(3) If the submitted document requires Contractor modification before JPL approval, the following steps shall be taken:

(a) The required modifications will be transmitted or discussed between the cognizant parties.

(b) The Contractor shall submit an updated document, containing the required modifications, within two weeks (unless otherwise specified) after the modifications have been defined.

(c) If the updated document is approved by JPL, JPL will transmit the signed cover or title page to the Contractor. The Contractor shall then prepare and deliver final copies as indicated in the CDRL.

Note: The requirements and approvals for data item revisions shall be the same as applied to the original data item submittal unless otherwise specified in the CDRL or DRD.

Due Date

Unless otherwise specified, all due dates identified in Block 9 of the CDRL are in calendar days. Documentation shall be delivered as early as available, but not later than the date specified in the CDRL.

Quantity

The number of copies to be delivered is provided in Block 10, QUANTITY, of the CDRL. All data shall be delivered by a letter of transmittal to the JPL Contract Negotiator. The term "ORIG" is to be interpreted as meaning a reproducible copy, and "Via email" is an electronic copy (transmittal by disc or CDROM is acceptable).

List of Data Requirement Descriptions

DRD# Title

ANALYSIS MODELS (AM)

AM 001 Structural Analysis (Phase 2 only)

AM 002 Thermal Analysis (Phase 2 only)

CONFIGURATION MANAGEMENT (CM)

CM 001 Configuration Management Plan

ENGINEERING (EN)

EN 001 Electronic Parts Specification

EN 002 End Item Data Package

EN 003 Engineering Drawings

EN 004 Photographs

EN 005 Copyright Releases for Contractor Copyrighted Documents

MANAGEMENT (MA)

MA 001 Rad Hard Memory Component Phase 1 Implementation Plan

MA 002 Rad Hard Memory Component Phase 2 Implementation Plan

MA 003 Work Breakdown Structure

MA 004 Schedules

MA 005 Program Status Reviews and Reports

MA 006 Review Packages and Reports

MA 007 Financial Plans and Reports

MA 008 Final Report

PRODUCT ASSURANCE (PA)

PA 001 Product Assurance Plan

PARTS, MATERIAL AND PROCESSES (PMP)

PMP 001 Developmental Problem/Failure Reports

RELIABILITY ASSURANCE (RA)

RA 001 Reliability Analysis

TEST (T)

T 001 Component Test and Verification Plan

T 002 Test Specifications

T 003 Test Procedures

T 004 Test Reports

ITEM NO.	DRD NO.	TITLE OR DESCRIPTION OF DATA	7. APPR. CODE	8. FREQUENCY OF ISSUE	9. DATE DUE TO JPL	10. QUANTITY ORIG.	VIA EMAIL	11. REMARKS
	AM	**Analysis Models**						
1.	AM 001	Structural Analysis Initial	A	Once, Phase 2	30 days prior to CDR	1	1	"Pro/Mechanica" or equivalent code.
		Final	A	Once, Phase 2	10 days after JPL approval of draft	1	1	
2.	AM 002	Thermal Analysis Initial	A	Once, Phase 2	30 days prior to CDR	1	1	"Pro/Mechanica" or equivalent code.
		Final	A	Once, Phase 2	10 days after JPL approval of draft	1	1	
	CM	**Configuration Management**						
3.	CM 001	Configuration Management Plan Initial	A	Once Phase 1	30 days ADOC	1	1	
		Initial	A	Once Phase 2	30 days after date of option	1	1	
		Final	A	Once Phases 1&2	10 days after JPL approval of Draft	1	1	
	EN	**Engineering**						

CONTRACT NUMBER SPECIMEN	CONTRACTOR TBD	PROGRAM JUPITER ICY MOONS ORBITER (JIMO)

ITEM NO.	DRD NO.	TITLE OR DESCRIPTION OF DATA	7. APPR. CODE	8. FREQUENCY OF ISSUE	9. DATE DUE TO JPL	10. QUANTITY ORIG.	10. QUANTITY VIA EMAIL	11. REMARKS
4.	EN 001	Electronic Parts Specification Draft	A	Once Phase 1	Two weeks prior to PDR	1	1	
		Final	A	Once Phase 1	30 days after PDR	1	1	
		Draft Revision	A	Once Phase 2	Two weeks prior to CDR	1	1	
		Final Revision	A	Once Phase 2	30 days after CDR	1	1	
5.	EN 002	End Item Data Package (Assembly)	X	As required Phases 1&2	With delivery of assembly	1	1	
6.	EN 003	End Item Data Package (Component)	X	As required Phase 2	With delivery of component	1	1	
7.	EN 004	Engineering Drawings Initial	A	Once Phase 1	30 days prior to PDR	1	1	
		Initial	A	Once Phase 2	30 days prior to CDR	1	1	
		Revisions	A	As required Phases 1&2	10 days after revision	1	1	
		Final	A	Once Phases 1&2	10 days after JPL approval of draft	1	1	

ITEM NO.	DRD NO.	TITLE OR DESCRIPTION OF DATA	7. APPR. CODE	8. FREQUENCY OF ISSUE	9. DATE DUE TO JPL	10. QUANTITY ORIG.	10. QUANTITY VIA EMAIL	11. REMARKS
8.	EN 005	Photographs	X	As required Phases 1&2	Once for each delivery	1	1	
9.	EN 006	Copyright Releases for Contractor Copyrighted Documents	X	As required Phases 1&2		1	1	With Photographs
	MA	**Management**						
10.	MA 001	Rad Hard Memory Component Phase 1 Implementation Plan						
		Initial	A	Once Phase 1	At Kickoff Meeting	1	1	
		Final	A	Once Phase 1	10 days after JPL approval of Draft	1	1	
11.	MA 002	Rad Hard Memory Component Phase 2 Implementation Plan						
		Initial	A	Once Phase 1	30 days prior to Phase 2 planning meeting	1	1	
		Final	A	Once Phase 1	20 days after JPL approval of draft	1	1	

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12.	MA 003	Work Breakdown Structure Initial	A	Once Phase 1	5 days ADOC	1	1	
		Initial	A	Once Phase 2	5 days after date of option.	1	1	
		Updates	A	As required Phases 1&2	5 days after change	1	1	
13.	MA 004	Schedules Initial	A	Once Phase 1	5 days ADOC	1	1	Only as Microsoft Project 2002 files.
		Initial	A	Once Phase 2	5 days after date of option	1	1	
		Updates	A	Monthly Phases 1&2	As part of MMR package	1	1	
14.	MA 005	Program Status Reviews and Reports Kickoff Meeting	X	Once Phases 1&2	As part of Meeting package	1	1	Only as Microsoft PowerPoint files
		MMR Package	X	Monthly Phases 1&2	At MMR	1	1	Only as Microsoft PowerPoint files
		Weekly Status Report	X	Weekly Phases 1&2	Monday following the reporting week.	0	2	Only as Microsoft Word files or as PDF files

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15.	MA 006	Review Packages and Reports						
		Review Packages	X	Once for each review Phases 1&2	3 days prior to review	0	1	
		Review Reports	X	Once for each review Phases 1&2	10 days after each review	1	1	

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16.	MA 007	Financial Plans and Reports:						
		Baseline Cost Estimate	A	Once Phase 1	15 days ADOC	1	1	To be updated only upon JPL request
		Baseline Cost Estimate	A	Once Phase 2	15 days after date of option	1	1	
		Monthly NASA 533M	X	Monthly Phases 1&2	10 days after close of Contractor's financial reporting period	2	1	
		Quarterly NASA 533Q	X	Quarterly Phases 1&2	15th of the month prior to the start of the quarter estimated in columns 8a through 8c of the 533Q	2	1	
		Earned Value Report	X	Monthly Phase 2	10 days after close of Contractor's financial reporting period	2	1	

ITEM NO.	DRD NO.	TITLE OR DESCRIPTION OF DATA	7. APPR. CODE	8. FREQUENCY OF ISSUE	9. DATE DUE TO JPL	10. QUANTITY ORIG.	10. QUANTITY VIA EMAIL	11. REMARKS
17.	MA 008	Final Report Phase 1	X	Once Phase 1	Completion of Phase 1 effort	2	1	
		Phase 2	X	Once Phase 2	Completion of Phase 2 effort	2	1	
	PA	**Product Assurance**						
18.	PA 001	Product Assurance Plan Initial	A	Once Phase 1	30 days prior to Phase 2 planning meeting	2	1	
		Final	A	Once Phase 1	10 days after JPL approval of draft	2	1	
	PMP	**Part, Material and Processes**						
19.	PMP 001	Developmental Problem/Failure Reports	X	As required Phase 2	2 days after event	2	1	
	RA	**Reliability Assurance**						
20.	RA 001	Reliability Analysis Preliminary	A	Once Phases 1&2	30 days prior to PDR and CDR	1	1	
		Final	A	Once Phases 1&2	10 days after JPL approval	1	1	
	T	**Test**						

CONTRACT NUMBER SPECIMEN	CONTRACTOR TBD	PROGRAM JUPITER ICY MOONS ORBITER (JIMO)

ITEM NO.	DRD NO.	TITLE OR DESCRIPTION OF DATA	7. APPR. CODE	8. FREQUENCY OF ISSUE	9. DATE DUE TO JPL	10. QUANTITY ORIG.	VIA EMAIL	11. REMARKS
21.	T 001	Component Test and Verification Plan						
		Draft	A	Once Phases 1&2	60 days prior to test	2	1	
		Final	A	Once Phases 1&2	10 days after JPL approval	2	1	
22.	T 002	Test Specifications						
		Draft	A	Once for each test Phases 1&2	60 days prior to testing	1	1	
		Final	A	Once for each test Phases 1&2	10 days after approval	1	1	
23.	T 003	Test Procedures						
		Draft	A	Once for each test Phases 1&2	60 days prior to testing	1	1	
		Final	A	Once for each test Phases 1&2	10 days after approval	1	1	

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ITEM NO.	DRD NO.	TITLE OR DESCRIPTION OF DATA	7. APPR. CODE	8. FREQUENCY OF ISSUE	9. DATE DUE TO JPL	10. QUANTITY ORIG.	10. QUANTITY VIA EMAIL	11. REMARKS
24.	T 004	Test Reports	A	Once for each test Phases 1&2	10 days after test	1	1	

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Structural Analysis	DRD No. AM 001
References: JPL 982-00037, Draft JIMO Hardware Reliability Assurance Requirements	Other: Contractor Format

Preparation Information:

Conduct and document a structural analysis of the memory component or system elements. At a minimum this shall include vibration effects as defined in the referenced Exhibit I document

Information delivered shall be Microsoft Office compatible.

Phase 2 Only.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Thermal Analysis	DRD No. AM 002
References: JPL 982-00037, Draft JIMO Hardware Reliability Assurance Requirements	Other: Contractor Format

Preparation Information:

Conduct and document a thermal analysis of the memory component or system elements showing compliance to referenced Exhibit I document.

Information delivered shall be Microsoft Office compatible.

Phase 2 only.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Configuration Management Plan for Phase 1 and 2	DRD No. CM 001
References:	Other: Contractor Format

Preparation Information:

The Contractor shall establish, within his organization, responsibility for implementing configuration management requirements as specified in this Contract. The responsibilities and methods needed to meet JPL requirements, plus any additional procedures the Contractor deems necessary to adequately manage the configuration, shall be documented in a Configuration Management Plan.

Plan and document the approach to implement configuration management (CM) during Phase 1 & 2. The plan shall address:

A. Organization – Describe the relationship of the contractor's program/project management group to the configuration management organization within the contractor's development environment. Describe the roles & responsibilities of each group in relation to CM. Describe the tools/databases used for the capture, storage, control & distribution of the various data files (requirements, specifications, drawings etc.) For example, if "wafer fabrication" will be required in Phase 1 and/or 2 then what group captures and maintains the fabrication baseline).

B. Configuration Identification – Describe and define which documents will be used for a configuration baseline, (e.g., requirements documents, specifications, drawings, fabrication processes, design tools, etc).

C. Configuration Control – Identify the policies and procedures used to control, approve, implement, and track changes to the established baseline. (For the development environment describe how the contractor ensures his technical personnel (and customer) are working from the same drawings, specifications, design revision number).. Define the interface with JPL's change control process.

D. Configuration Status Accounting – Identify where configuration status is captured and documented.

E. CM Requirement Flow-Down. Identify how CM requirements are flowed down to subcontractors/vendors (to assure all parties are using the same documents).

F. Program Phasing – Establish the major milestones for implementation of configuration management (beginning with design and ending with product delivery, include the fabrication process & design tools if applicable).

G. Management integration – Describe the integration of CM activities with other project/program management activities (Focus on Phase 1 & 2 development).

H. Configuration Audits – Describe plans for conducting configuration audits with the PDR and CDR and delivery of demonstration components (Phase 1 & 2 activities).

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Electronic Parts Specification	DRD No. EN 001
References:	Other: Contractor Format

Preparation Information:

Component Specification

The specification shall include the following information as a minimum:

1. Functional Description including input/output pin definitions, block diagram, description of internal registers, and truth table or command code list as applicable.

2. Drawing with Physical Dimensions.

3. Absolute Maximum Ratings.

4. Recommended Operating Conditions.

5. DC & AC Electrical Characteristics including test conditions and limits, and timing diagrams for AC tests.

6. Screening and qualification test requirements, including references to applicable industry, military, or other test methods and procedures.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: End Item Data Package (Assembly)	DRD No. EN 002
References: JPL 982-00025, Draft JIMO Parts Program Requirements; JPL 982-00036, Draft JIMO Problem/Failure Reporting (P/FR) Requirements	Other: Page 1 0f 2 Contractor Format

Preparation Information:

An End-Item Data Package (EIDP) shall be prepared and submitted for each subassembly to be delivered in accordance with the reference document and in a Contractor determined form. The EIDP delineates the fabrication and assembly history, operation history and performance characteristics of the hardware. The contents of the package shall include, but are not limited to the following information:

1. As-built data for all deliverable hardware; where "deliverable" consists of a compilation of items describing exactly the configuration of a fabricated serialized assembly, including:
   - a. Part number and revision letter of each item.
   - b. Part description (title) of each item.
   - c. Electronic part reference designation.
   - d. Serial number of each item, or if no serial number, the screening lot number when required.
   - e. Screening/demonstration/upgrade lot number, as applicable.
   - f. Procurement or other specification.
   - g. Generic part number.
   - h. Manufacturer.
   - i. Applicable waiver numbers (with latest revision letters).
   - j. Manufacturer's lot date code.
   - k. Traceability number (as applicable).
   - l. Test data.
   - m. Test and analysis reports.
2. A log book with a chronological history of day-to-day activities on each assembly starting with the first application of power to the assembly, and accumulated operating time and number of on/off cycles (and temperature conditions).

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: End Item Data Package (Assembly)	DRD No. EN 002
References: JPL 982-00025, Draft JIMO Parts Program Requirements; JPL 982-00036, Draft JIMO Problem/Failure Reporting (P/FR) Requirements	Other: Page 2 0f 2 Contractor Format

Preparation Information:

3. A list, including open or closed status, of all developmental problem/failure reports (DP/FR) generated against the hardware.

4. Summary of any deviations and waivers applicable to the delivered item.

This DRD is applicable only to those devices developed and delivered as subassemblies.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: End Item Data Package (Component)	DRD No. EN 003
References: JPL 982-00025, Draft JIMO Parts Program Requirements	Other: Page 1 0f 2 Contractor Format

Preparation Information:

An End-Item Data Package (EIDP) shall be prepared and submitted for each component or device to be delivered in accordance with the reference document and in a Contractor determined form. The EIDP delineates the fabrication and assembly history, operation history and performance characteristics of the hardware. The contents of the package shall include, but are not limited to the following information:

1. Data, including:
   a. Part number and revision letter of each item.
   b. Part description (title) of each item.
   c. Serial number of each item, or if no serial number, the screening lot number when required.
   d. Screening/demonstration/upgrade lot number, as applicable.
   e. Procurement or other specification.
   f. Generic part number.
   g. Manufacturer.
   h. Applicable waiver numbers (with latest revision letters).
   i. Manufacturer's lot date code.
   j. Traceability number (as applicable).
   k. Test data.
   l. Test reports.
2. A log book with a chronological history of day-to-day activities on each component starting with the first application of power, accumulated operating time, and number of on/off cycles (and temperature conditions).
3. Summary of any deviations and waivers applicable to the delivered item.

This DRD is applicable only to those devices developed and delivered which consist of a single microchip in a single package.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Engineering Drawings	DRD No. EN 004
References:	Other: Contractor Format

Preparation Information:

Engineering drawings shall be prepared to support the design. They shall disclose engineering design information sufficient to evaluate an engineering concept.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Photographs	DRD No. EN 005
References:	Other:

Preparation Information:

Color photographs shall be provided for each hardware deliverable item (including any unique support equipment if required) and examples of test configurations as follows:

1. Each side of each deliverable item.
2. Components, such as MCMs, prior to sealing or prior to and after application of any polymer compound.
3. The equipment photographed shall be arranged such that component serial numbers are visible.
4. Precautions shall be taken to assure sharp, carefully exposed pictures, since enlargement will be necessary.
5. The following information shall be supplied with each photograph:
    a. A concise title, accurately describing the subject matter photographed, including part number and serial number (on photo).
    b. Functional Requirements name and JPL designator number (on photo).
    c. Contractor's internal file designation, for image retrieval.
    d. Date the photograph was taken.
    e. Where the photograph was taken.
    f. The top (orientation) of each photograph (on photo).
    g. A ruler or scale to indicate relative size of the subject (on photo).
    h. Digital photographs in both "RAW" and JPEG format

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Copyright Releases for Contractor Copyrighted Documents	DRD No. EN 006
References:	Other: Contractor format

Preparation Information:

These copyright releases shall expressly authorize the use of the subject printed and graphic materials, as applicable. The release must be signed and dated by a duly authorized representative of the copyright holder. Each release shall specify the title of the printed and graphic material, publication date, and copyright date, as a minimum.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Rad Hard Memory Component Phase 1 Implementation Plan	DRD No. MA 001
References: None.	Other: Contractor Format

Preparation Information:

Phase 1
The Contractor shall prepare and deliver a combined technical and management plan to describe:

The design and management of the Phase 1 (Proof of Concept) component development including all tests and qualifications. (The proposed final design will emerge from completion of Phase 2 (Required Density) design and test. Production , qualification, and delivery of flight qualified parts based on this design shall occur in Phase 3).

The approach to design the Proof of Concept Rad Hard Memory Component/Device/Element/Subassembly to satisfy the performance capabilities described in the Exhibit III Rad Hard Memory Functional Requirement.

The management and implementation of the radiation test efforts.

The design, fabrication, test and delivery of Proof of Concept model components during Phase 1.

The management of the Phase 1 activities including necessary Technical Interchange Meetings and Monthly Management Reviews to report technical progress, cost and schedule.

The support of a JPL Mission Assurance Site Inspection of the Contractor's manufacturing facility and foundry, and JPL pre-cap inspection of components manufactured during Phase 1.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Rad Hard Memory Component Phase 2 Implementation Plan	DRD No. MA 002
References: None.	Other: Contractor Format, Page 1 of 2

Preparation Information:

Phase 2 (Planning)

This Plan will be used to judge viability referred to in Article 4 paragraph 1.2 of the specimen contracts. It will also be used in the best value evaluation referred to in Article 4 paragraph 1.3 of the LM and NVMM specimen contracts. The Plan shall be presented as part of the Phase 2 Planning Review.

The Contractor shall prepare and deliver a combined technical and management plan to describe:

The differences between the Phase 1 Proof of Concept component/device/element/subassembly and the proposed final design emerging from completion of Phase 2.

The approach to upgrade the Phase 1 Proof of Concept component/device/element/subassembly to satisfy the performance capabilities described in Exhibit III, including at a minimum the following:

COMPONENT	**SUROM**	**LM**	**NVMM**
Properties/Cell design: (cell size feature size, power control, decoding, sense,& radiation hardness technology)	Same as for final product	Same as for final product	Same as for final product
RadHardness: (TID)	per Functional Requirement	per Functional Requirement	per Functional Requirement
SEU, SEE, SEFI	Required	Required	Required
Latch-up immunity	Required	Required	Required
Life: by analysis	per Functional	per Functional	per Functional
Retention time	Requirement	Requirement	Requirement
Cycles before wear out			
Form factor			Volume per specs.
Cycle time		10 ns± 5 ns	< 300 ns
Technology specific risk mitigation strategy	Required	Required	Required

The methods you will use in Phase 2 to verify component, device, element, or subassembly life, data retention time, radiation hardness and environmental compatibility requirements.

The preparation and/or scale-up of critical/essential production processes to be ready to begin Phase 3 production of fully qualified components. (Describe these critical/essential processes as applied in Phase 1 and to be upgraded during Phase 2).

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Rad Hard Memory Component Phase 2 Implementation Plan	DRD No. MA 002
References: None.	Other: Contractor Format, Page 2 of 2

Preparation Information:

(Continued)

The approach to enhance design, fabrication, test and delivery of components/devices/elements/ subassemblies (e.g., "Required Density" components) during Phase 2 that confirm the enhancements in Phase 2 will lead to production of qualifiable components during Phase 3.

The management of the Phase 2 activities including necessary technical interchange meetings and Monthly Management Reviews to report technical progress, cost and schedule.

The methods you will use to integrate Phase 2 cost and schedule data, develop a Performance Measurement Baseline, and calculate monthly Earned Value on the Contract. Also describe your plan for providing the JPL Contract Technical Manager with monthly Earned Value information, and analyses of any resulting schedule and cost variances greater than ± 5 %.

The Contractor shall prepare and deliver a cost proposal for Phase 2. The Contractor shall follow the same cost instructions required for the Phase 1 proposal (see Volume II of JPL RFP No. 011204), except that all items in Paragraph 1.2 of the referenced RFP shall be included as part of the plan.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Work Breakdown Structure	DRD No. MA 003
References:	Other: Contractor format,

Preparation Information:

The Contractor shall prepare a Work Breakdown Structure and WBS Dictionary that portray the plan for accomplishing all of the activities necessary to meet the requirements of the Statement of Work within the time constraints imposed by the Performance and Delivery Schedule of the Contract. The WBS shall depict all activities down to level 2 at a minimum.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Schedules	DRD No. MA 004
References:	Other: Contractor format, Microsoft Project 2002 only

Preparation Information:

The Contractor shall prepare Schedules that portray the plan for accomplishing all of the activities necessary to meet the requirements of the Statement of Work within the time constraints imposed by the Performance and Delivery Schedule of the Contract. The schedules shall include activities of subcontractors and foundries and all documentation deliverables required in This Exhibit. All schedule items shall be traceable to the cost activities and work breakdown structure (WBS).

After approval of the Initial Schedules by JPL, the start and completion dates on the Initial Schedules shall become the planned start and completion dates reflected on all monthly updates to the Schedules. Monthly updates to the Schedules shall also reflect any progress the Contractor has made toward accomplishing the scheduled activities and any projected changes to the start and completion dates of scheduled activities.

Detailed Schedule - The Detailed Schedule shall portray the following information for each of the Contractor's lowest-level activities:

a) Activity Description,

b) Planned Start Date,

c) Planned Completion Date,

d) Forecast Start Date,

e) Forecast Completion Date,

f) Actual Start Date,

g) Actual Completion Date, and

h) Critical Path shall be defined by a distinctive marking.

The Contractor shall be responsible for establishing the schedule interdependencies among the lowest-level activities.

The schedules shall be prepared using Microsoft Project 2002.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Program Status Reviews and Reports	DRD No. MA 005
References:	Other: Page 1 of 4

Preparation Information:

Purpose: To communicate program status to JPL and Contractor's management on a timely basis including accomplishments versus planned milestones, resource expenditures versus planned expenditures, and major problems, especially those requiring management assistance, resolution or action.

1. KICKOFF MEETING

A Kickoff Meeting shall be held at the Contractor's facility in accordance with the Program Schedule. The Kickoff meeting is intended to be a one day meeting and assure the following: Identification of critical issues, open items, developmental plans, concerns, risks and an understanding of the Statement of Work, Exhibit III Functional Requirement, and Contractor's plans to accomplish the work, including staffing plans and schedules.

2. MONTHLY MANAGEMENT REVIEWS (MMRs)

A. General/Background

Each month, prepare for, and hold a MMR with an agenda mutually agreed upon in advance with the CTM. Prepare and submit a MMR Report that summarizes, with attachments as necessary, the significant issues and action items, schedules, updated action item log. With CTM concurrence, the Contractor may combine a major design review meeting with an MMR to minimize travel and other meeting costs.

B. Presentation & Presentation Materials

In accordance with an agreed upon agenda, present a summary of technical, management, financial, and contractual activities for the past period:

1) Technical progress of the deliverable hardware, software and support equipment design, analysis, fabrication and testing.
2) Subcontract Status, including any agreed to or potential in-scope or out-of-scope changes.
3) Schedule Status in the areas of design, analysis, procurements, manufacturing, testing and documentation.
4) Parts, Materials & Processes Status.
5) Resource summary reports for mass & power (Estimate or actual versus allocation).
6) Current or anticipated technical, schedule or cost problems and the planned solutions or alternatives.
7) Historical cost report.
8) Action Items and agreements status. (Action items shall only be considered closed if agreed upon by JPL and contractor cognizant personnel.)
9) Attendee list and action item list.

Preparation Information: (Continued)

9) Cost status and earned value, including cost tracking and an analysis of any variance greater than ± 5%. (Earned value is Phase 2 only.)

10) Plans for the next report period.

C. Meeting Minutes:

The Contractor shall prepare concise, descriptive minutes of the MMR. Specific items to be included are:

1) Modification, corrections, or revisions to material submitted or presented at the review.

2) Significant statements of policy or procedure, or commitments, made by JPL or Contractor Management.

3) Agreements between JPL and the Contractor.

4) Action Item status summary. (Action items shall only be considered closed if agreed upon by JPL and Contractor cognizant personnel.)

3. TECHNICAL INTERCHANGE MEETINGS (TIMs)

The Contractor also performs the following:

A. Develops an agenda and attendee list for meetings and coordinates the agenda with the JPL Contract Technical Manager.

B. Holds the meeting and records meeting minutes, action items and publishes a meeting report for each TIM including attendees and action item list..

C. Delivers the meeting report for each Technical Interchange Meeting to JPL.

4. WEEKLY STATUS REPORT

The Weekly Status report contains the following information:

A. Accomplishment/Schedule Status. Identify progress versus planned accomplishments for the past week and any major (to JPL) status of activities and anticipated changes in scheduled milestones, rationale for missed milestones, and specific actions to prevent impact to the critical path.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Program Status Reviews and Reports	DRD No. MA 005
References:	Other: Page 3 of 4

Preparation Information: (Continued)

B. Planned accomplishments for the current week.

C. Problems Status. State progress toward solving or averting problems previously identified. Discuss new major problems identified during the past week and any actions by or assistance from Contractor's management or JPL. Identify potential problem areas and recommend actions for JPL.

5. PRELIMINARY DESIGN REVIEW (PDR)

This review shall be conducted after preliminary versions of design descriptions have been completed. The PDR shall be completed prior to CDR (all action items closed).

The objectives are to:

A. Ensure that design requirements are completely understood and the proposed designs will satisfy the design requirements.

B. Assess the status of Contractor's technical efforts.

C. Ensure requirements and derating factors for radiation design are adequately reflected in the design approach.

D. Evaluate and approve the design approach and constraints including performance margins and resource margins (such as mass, power and volume).

E. Ensure that applicable project documents are being followed.

F. Assess the status of support or specialized test equipment and plans for future development.

6. PHASE 2 IMPLEMENTATION REVIEW

The Phase 2 Implementation Review (conducted toward the end of Phase 1, [see MA 002]) shall address hardware detail design, software development status and plans, and readiness to proceed with the upgrading of Proof of Concept designs during Phase 2 to permit the fabrication, test and delivery of production-level Flight-qualified components beginning in Phase 3.

The objectives are to:

A. Address the differences between the Phase 1 component and the proposed final design emerging from completion of Phase 2.

B. The approach to enhance the Phase 1 Proof of Concept component to satisfy the performance capabilities described in the Exhibit III Functional Requirement.

C. Ensure the enhanced design (and margins) will meet performance, reliability, safety, and design requirements for the length of the mission.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Program Status Reviews and Reports	DRD No. MA 005
References:	Other: Page 4of 4

Preparation Information: (Continued)

D. Ensure that a test activity is planned to confirm the component capabilities (including radiation environments). This activity shall be documented in Phase 2 by the update of Phase 1 test plans, procedures, test vectors and software, and test reports.

E. Ensure that the support equipment design and checkout is adequate and will be available to test the component hardware.

F. Ensure that design analyses are complete and there is an agreed-upon plan to resolve any issues or concerns.

G. Ensure that all requirements for conducting a critical design review (CDR) are understood.

H. Assure the proposed cost for Phase 2 are viable.

7. CRITICAL DESIGN REVIEW (CDR)

This review shall be conducted after final versions of design descriptions have been completed.

The objectives are to:

A. Ensure that the final designs will satisfy the functional requirements.

B. Assess the status of Contractor's technical efforts.

C. Ensure requirements and derating factors for radiation design margins are adequately reflected in the design.

D. Evaluate and approve the design and constraints including performance margins and resource margins (such as mass, power and volume).

E. Ensure that applicable project documents are being followed.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Review Packages and Reports	DRD No. MA 006
References:	Other: Contractor format

Preparation Information:

Purpose: To provide agenda, presentation material and other technical data required for reviews and to provide a status and summary of action item closures for the reviews defined DRD MA 005 which include:

1. Advance Review Package Data Submittal Requirements

Review agendas and required data submittals shall be in accordance with DRD MA 005.

2. **Meeting Minutes**

The Contractor shall prepare concise, descriptive minutes of each review. Specific items to be included are:

A. Modification, corrections, or revisions to material submitted or presented at the review.

B. Significant statements of policy or procedure, or commitments, made by JPL or Contractor Management.

C. Agreements between JPL and the Contractor.

D. Action Item status summary.

3. **Action Items**

Action items assigned during reviews and meetings, including working meetings, shall be closed-out and the status maintained as follows:

A. Action Item Responses

Each action item close-out report shall include, as a minimum:

1. Restatement of the action item.
2. Summary recommendation and conclusion.
3. Detail descriptive narrative, analysis, calculations or other data as necessary to respond to the action items including rationale for recommendations and conclusions.

Action items shall only be considered closed if agreed upon by JPL and contractor cognizant personnel.

B. Status Summary

A status summary for all action items from all meetings or reviews shall be maintained. The summary shall indicate, for each action item, the date it was assigned, the name of the person responsible for resolving the action item, and the date resolution is due.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Financial Plans and Reports	DRD No. MA 007
References: NPG 9501.2d NASA Contractor Financial Management Reporting, NASA Forms 553M and 553Q	Other:

Preparation Information:

1. **Baseline Cost Estimate**

   The Contractor shall prepare a detailed Program Baseline Cost Estimate which is equal to the negotiated Contract cost and is consistent with the Program and milestone schedules for the management, design, fabrication, assembly, testing and delivery of all deliverable items. The Baseline Cost Estimate shall be the basis for cost performance monitoring and shall be upgraded if and when significant contractual modifications/redirection occur.

2. **Monthly Financial Report**

   The Contractor shall prepare NASA form 533M, in accordance with the instructions set forth in NPG 9501.2d and on the reverse side of the form, for every level 2 (as negotiated) report item.

3. **Quarterly Financial Report**

   The Contractor shall prepare NASA form 533Q, in accordance with the instructions set forth in NPG 9501.2d and on the reverse side of the form, for every level 2 (as negotiated) report item

4. **Earned Value (Phase 2 only)**

   The contractor shall, as part of the MMR report the planned value, earned value, actual cost incurred, schedule variance, and cost variance generated by the Contractor's earned value management system, for both the current month and cumulative to date, for each WBS level 2 report item. Causes of any cost or schedule variances (either positive or negative greater than 5 %) shall be discussed and appropriate actions to resolve the unfavorable variances shall be proposed.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Final Report	DRD No. MA 008
References:	Other:

Preparation Information:

A Final Report summarizing all activities of the contact effort shall be prepared. At a minimum this includes:

1) a list of deliverables made,
2) a list of all components on hand,
3) a brief summary of work completed since the last MMR (Ref DRD MA 005),
4) a summary of all action item status,
5) a summary of cost to date,
6) a summary of any open items including costs, and
7) any residual materials that would be disposed.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Product Assurance Plan	DRD No. PA 001
References: JPL 982-00035, Draft JIMO Project Mission Assurance Requirements	Other: Contractor format

Preparation Information:

A Product Assurance Plan, in accordance with the requirements of the referenced Exhibit I document shall be prepared. This plan shall provide insight as to how the contractor will manage the various product assurance activities. At a minimum this plan shall include:

1) A description of the overall product assurance program;
2) Workmanship standards for contractor and subcontractors;
3) Procedures that implement the QA portion of the Mission Assurance Plan;
4) Training plans;
5) Hardware quality assurance;
6) Electro Static Discharge (ESD) control plans;
7) Radiation assessment, test, and mitigation;
8) Reliability analysis and assurance;
9) Inspection procedure/specifications (including, but not limited to, incoming inspection procedures);
10) Hardware travelers;
11) Rework procedures and repair instructions;
12) The contractor's problem reporting system;
13) Materials and process control procedures;
14) Discrepancy Reports;
15) Configuration management; and
16) Environmental test and analysis program.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Developmental Problem/Failure Reports	DRD No. PMP 001
References: JPL 982-00036, Draft JIMO, Problem Failure Reporting (PRF) requirements	Other: Phase 2 only

Preparation Information:

Applies to Phase 2 subassemblies only.

Each report shall be submitted in accordance and be responsive to the requirements of JPL 982-00036. This includes P/FRs from sub-tier contractors. Each report shall include, but not be limited to, the following:

A. Complete identification of the hardware;
B. Date the problem/failure/anomaly occurred;
C. Estimated accrued operating hours and/or cycles at the time the problem/failure/anomaly occurred;
D. Location of the hardware when the problem/failure/anomaly occurred;
E. Hardware environmental conditions when the problem/failure/anomaly occurred;
F. Test/operation being performed;
G. A description of the problem/failure/anomaly incident and the potential impact on the subsystem functional performance;
H. A description of the problem/failure/anomaly analysis, including impact on hardware;
I. Cause of the problem/failure/anomaly;
J. A description of the corrective action taken;
K. A description of the method used to verify that the corrective action was effective;
L. Safety rating;
M. Supporting material shall be provided to allow JPL to perform the mission risk assessment;

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Reliability Analysis	DRD No. RA 001
References: JPL 982-00025 Draft JIMO Parts Program Requirements, JPL 982-00037, Draft JIMO Hardware Reliability Assurance Requirements, JPL D-8545 Electronic Parts Derating Guidelines	Other: Contractor Format

Preparation Information:

1. **Electrical Part Stress Analysis (PSA)** (deliverables containing more than one component)

Electrical stress analysis shall be performed and documented to verify the applied stress on each piece part does not exceed the derating values established in JPL D-8545 .

2. Single Event Effects (SEE) Analysis

Circuit designs containing SEE sensitive parts shall be tested and analyzed to identify the effect of SEEs, Single Event Upset (SEU), SEFI and SEL and to assure compliance with the deliverable item requirements per JIMO Parts Program Requirements .

Conduct and document a SEE test and analysis to confirm the induced SEU rate requirements in the reference document.

The method of determining the Activation Energy shall be clearly identified.

3. Life Projection Analysis

The life projection analysis shall utilize existing life information combined with component test information regarding failure mechanism activation energies, etc., address expected failure mechanisms during the twenty (20) year mission life, and project the component life as required per Exhibit III

4. **Worst Case Analysis**

The WCA shall be performed and documented for all circuit designs to demonstrate that sufficient operating margins exist for all operating conditions and performance requirements. Conduct and document the analysis as required in the reference JIMO Hardware Reliability Assurance Requirements (JPL 982-00037).

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Component Test and Verification Plan	DRD No. T 001
References: JPL 982-00025, Draft JIMO Parts Program Requirements	Other: Contractor format.

Preparation Instructions:

Provide a detailed description of the methods to be used for component functional electrical characterization and radiation testing.

This test program plan shall be prepared in accordance with the requirements herein. This document shall include, but not be limited to, the following for each test planned:

1. Statement of relationship of this planned testing to overall component development effort and contribution to Phase objectives.
2. Matrix depicting Exhibit III Functional Requirement and test method to demonstrate compliance of each requirement.
3. A planned test flow which shows the sequence of functional, performance, and radiation testing to be performed on the component.
4. The conditions of the test (e.g., room or elevated temperature, voltage levels and margins, radiation type & source, etc.) as applicable.
5. Test equipment, including environmental equipment and instruments to be used and their calibration.
6. Test setup.
7. Schedule to accomplish testing and evaluation of results.
8. Margin testing per applicable part specification.

The plan shall further reference the radiation test plan and results and the reliability test results.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Test Specifications	DRD No. T 002
References:	Other: Contractor Format

Preparation Information:

The test specification describes the formal test for the component, device, element, or subassembly. The specification describes the environment and resources required for the test and provides a schedule of test activities to verify the Exhibit III requirements.. In addition, the test specification identifies the individual tests that shall be performed based on the test matrix developed for DRD T 001. The test specification shall include at a minimum:

Identification of the component, device, element, or subassembly.

Test environment identifies and describes the resources (software, test equipment, chambers, etc.) required for the test. The purpose of each item shall be described.

Individual test descriptions shall include:

1) Test objective,
2) Any special requirements,
3) Cross reference to the requirements of the Exhibit III Function Requirement addressed by this test,
4) The type of data to be recorded,
5) Assumptions and constraints,
6) Detailed list of test equipment and facilities required, and
7) Software test cases (as required).

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Test Procedures	DRD No. T 003
References:	Other: Contractor Format

Preparation Information:

The test procedure contains the detailed procedures necessary to perform testing of the component, device, element, or subassembly. The procedure shall reference the test plan (DRD T 002).

The test is identified by name.

Test setup shall be defined and at a minimum includes:

1) Specific test equipment (hardware and software) identified by name
2) All switch settings and wiring interconnections between the various test equipment and the item under test.
3) One or more diagrams showing the hardware, interconnections and data paths.
4) Precise step-by-step instructions for placing the hardware in a state of readiness.

Precise step-by-step instructions for the specific test, including:

1) Test operator actions and equipment operation required for each step.
2) Expected results for each step. Space shall be included for handwritten real-time test results to be entered.
3) Evaluation criteria for each step, as applicable.
4) Actions to follow in the event of a failure or indicated error.
5) Procedures to be used to reduce and analyze test results.

DATA REQUIREMENT DESCRIPTION	EXHIBIT II
Title: Test Reports	DRD No. T 004
References:	Other: Contractor Format

Preparation Information:

The test report is a record of the formal testing performed on a component, device, element, or subassembly.

The test report shall reference the test specification (DRD T 002) and test procedure (DRD T 003). The report identifies the component, device, element, or subassembly tested; the location, date and time of the test; and the test organization and individuals performing the test.

The complete, filled out (as run) test procedure is included in the test report.

Detailed test data shall be included.

All analysis of the test data shall be included.

An evaluation of the results and recommendations shall be included.

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